# KA2100: Superior by Design
**VERSION 1 ©2008**

*The information below is not guaranteed to be free of errors.*

## 1. Introduction

I highly recommend the DE1102, DE1103, and KA2100 portables. Performance comparison revealed the KA2100 as champion on MW, FM, and SW. Examination of each radio's internals and schematics helped illuminate how *Redsun Electronics* achieved this feat. The KA2100, with its lack of SSB and unrefined software, could easily end up hastily dismissed. Beneath the silver and black exterior resides an old-school PCB and solid RF engineering. The KA2100 makes heavy usage of mechanical controls. It is possible the KA3100 will end up our next king of low-priced portables.

| Radio | RF | BW | Step | SSB | Cost | Size | Mem | Knob | NiMH |
|---|---|---|---|---|---|---|---|---|---|
| DE1102 | GOOD | 2 | 1 kHz | YES | $64 | 22 $in^3$ | 133 | NO | YES |
| DE1103 | GOOD | 2 | 1 kHz | YES | $64 | 31 $in^3$ | 268 | FAIR | YES |
| KA2100 | GOOD | 2 | 1 kHz | $33 | $100 | 229 $in^3$ | 30 | GOOD | $18 |

## 2. Design Comparison

The MW section of each radio consists of a ferrite rod antenna followed by an RF amplifier. The KA2100 uses Twin-Coil technology invented by *Chris Justice*. Each end of the ferrite contains a pick-up coil that feeds into a combining transformer. MW tuning in the KA2100 is done via MCU control and is transparent to the user. Stand-alone Twin-Coil antennas cost $100.00 at C. Crane.

The FM section of each radio is diode switch, enters a TA7358 FM front-end chip, goes into two 10.7 MHz filters, and finishes in the tuning chip. The KA2100 has a separate FM demodulator, the LA3335. The KA2100 alone has a tuned BPF and post-amplification uses dual tuning elements.

| Radio | MW Twin-Coil | MW Tuned | FM RF | FM Tuned | FM Demod |
|---|---|---|---|---|---|
| DE1102 | NO | NO | LC | SINGLE | TA8132 |
| DE1103 | SOME UNITS | NO | BPF | SINGLE | TA2057 |
| KA2100 | YES | YES | TUNED | DUAL | LA3335 |

The AM (and MW) section of each radio consists of a BPF, LPF, attenuator, dual JFET mixer, BPF, single JFET mixer, two IF filters, AM/FM tuning chip, and an MCU controlled PLL, the LC72137 (tuning both AM and FM local oscillators). The KA2100 alone has input protection diodes, RF gain control, and five metal shielded areas on the PCB. Note the DE1102's lower first IF of 10.700 MHz.

| Radio | Diode Protect | RF Gain | $1^{ST}$ IF MHz | $2^{ND}$ IF kHz | Tuner Chip | Boxed Shields | SSB |
|---|---|---|---|---|---|---|---|
| DE1102 | NO | NO | 10.700 | 450 | TA8132 | 2 | YES |
| DE1103 | NO | NO | 55.845 | 450 | TA2057 | 3 | YES |
| KA2100 | YES | YES | 55.845 | 455 | LA1260 | 5 | NO |

The audio section on the physically larger KA2100 is beefier and drives a five inch speaker. The KA2100 has separate bass and treble control knobs. Unlike in many radios, these tone circuits actually work. The KA2100 utilizes a TDA2822 Dual Power Amplifier run in bridge configuration. It is buffered using a whopping 8800 microfarads of capacitance and can output five watts of power.

| Radio | Bass/Treble | Audio Amp | Buffering | Power |
|---|---|---|---|---|
| DE1102 | 2 settings | LM4811; LM4862 | 220 µF; 470 µF | 210 mW; 400 mW |
| DE1103 | 2 settings | CXA1622 | 220 µF | mW |
| KA2100 | 2 knobs | TDA2822 | 8800 µF | 5000 mW |

## 3. E1 versus KA2100

The $500 E1 is superior to the KA2100 in numerous ways. However, the KA2100 also has a laundry list of better features, it has a: folding handle; heavy knob with dimple; backlit keys; crisp display; internal transformer; easy battery access; firm battery holder; 'AA' or 'D' battery power; NiMH charger; firm antenna; separate MW antenna jack; tuned Twin-Coil ferrite rod; two antenna adapter plugs; metal speaker grill; RF gain; attenuator; IF output; 5-kHz SW plus 9/10-kHz MW knob steps; 12 hour time format; and no safety recall. Ironically the technically lesser KA2100 has better audio than the E1 which could be due to the sloppier filters and better bass-treble controls. The KA2100 is definitively better on MW due to the antenna; while slightly more sensitive on SW.

The KA2100 is not without its negatives, the biggest is its memory recalling system. There are only 10 hard-to-recall memories per 10-MHz SW segment. Memories *should* be accessible via the tuning knob! The KA2100 has no keypad and that would be fine with ±0.5 MHz up/down slew buttons (equivalent to two full knob turns). Other negatives include two noisy band-change beeps, delayed button response, SSB via $33 external 4 'AA' powered unit, and use of 32Ω headphones.

Note that the DE1102 and DE1103, which cost two thirds as much, include earphones, long wire antenna, NiMH batteries, wrist loop, cloth pouch, integrated SSB capability, and are smaller. One plus the KA2100 has on these radios is its 5-kHz knob tuning steps: manual scanning is fun.

The outward appearance of the Eton S350DL is akin to the KA2100. However the S350DL is a second-rate drifty analog-tuned single-conversion radio utilizing a digital frequency counter.

## 4. Use Earphones; Turn Key Light Off

Using 15,000 mAh Duracell alkaline "D" batteries the KA2100 can be powered indefinitely (8.5 years) with the radio off. With speaker power, batteries will last ~54 hours. The big surprise is that using earphones (32Ω needed) the KA2100 will last ~202 hours! Stretching battery life is easy: use earphones, turn the key light off (switch), and turn the backlight off (via LIGHT button).

| KA2100 Power Consumption | | | | | | |
|---|---|---|---|---|---|---|
| Quiescent | MW/SW | FM | RF-gain | Backlight | Keylight | Earphones |
| 0.2 mA | 277 mA | -4 mA | +2 mA | +12 mA | +35 mA | 74 mA |
| 75000 hr | 54 hr | 55 hr | 53 hr | 52 hr | 48 hr | 202 hr |

*Values are added (+) or subtracted (-) from 277 mA; earphones value is for MW/SW.*

## 5. Discussion

In my opinion the KA2100 is an instant SW classic. The engineers at *Redsun Electronics* in China deserve a round of applause. They went the extra mile with each section of the radio [MW, FM, SW]: designing for excellence. The radio uses the same chip (TDA2822) and a similar speaker (8Ω; 5W) to that used in the Eton E1. Except for the two loose-fitted band-switch knobs the radio is extremely well built; as is the AC cord. It will be interesting to see how the KA3100 pans out.

## 6. KA2100 Quick Reference

This guide only includes non-obvious functions. With the internal speaker select FM MONO; use FM STEREO with headphones. Press RESET following changing the MW steps from 9/10 kHz.

| Function | Sequence | Comments |
|---|---|---|
| BACKLIGHT | LIGHT | Continuous backlighting. Note the display flash. |
| TURN OFF TIME | POWER | Pressing lowers automatic turn off time.<br>Note: "on" means radio stays continuously on. |
| SEARCH | UP OR DOWN | DOWN Search stops on active stations. |
| SAVE MEMORY | MEM {UP\|DOWN}<br>MEM | Press UP or DOWN to select the memory slot. |
| RECALL MEMORY | PRESET | Pressing PRESET cycles through memories. |
| CHARGE BATTERY | PRESET | OFF Charging auto stops. Note: battery icon will flash. |
| LOCAL WORLD | W/L | OFF Change between World or Local display time. |
| TIME SET | MEM {UP\|DOWN}<br><KNOB> MEM | OFF UP and DOWN cycles through time.<br>UP selects hours; DOWN selects minutes. |
| 12/24 FORMAT | UP | OFF Note: AM/PM displayed in 12 hour format. |
| SET TIMER | TIMERA {UP\|DOWN}<br><KNOB> TIMERA | OFF Same for TIMERB.<br>UP selects hours; DOWN selects minutes. |
| VIEW TIMER | TIMERA | OFF Same for TIMERB. |
| ACTIVATE TIMER | TIMERA ALARM | OFF Pressing ALARM cycles BUZZER, RADIO, and OFF. |
| ALARM OFF | POWER | Stops the alarm (3 minute buzzer or 60 minute sound). |
| SNOOZE | SNOOZE | Five minute snooze works four total times. |
| BUTTON BEEP | SNOOZE | Toggles button beep sound on and off. |
| QUICK TUNE | Q.TUNE | Steps: MW 100 kHz; FM 1000 kHz; SW by band. |

GREEN indicates that the button must be pressed and held.
OFF indicates that the radio must be off for the function.
*WARNING: Only attempt to charge rechargeable batteries.*

### REFERENCE

*Send comments to* just_rtfm@<NOSPAM>yahoo.com. dr phil :)
*See my other articles at:*
*http://www.radiointel.com/reviews.htm*
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A man's character is his fate.

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